Fric, V.

Fric, V. Instability of the auxiliary impulse in the switch valve. p. 643.
Haj. A precise differential amplifier. Tr. from the English. p. 643.
Sk, Antimony-lithium photocathode. Tr. from the Russian. p. 644.
2d Exhibition of the Czechoslovak Machinery Industry in Brno.
(To be contd) p. 646.

Vol. 17, no. 11, Nov. 1956
SLABOPROUDY OBZOR
TECHNOLOGY
Czechoslovakia

So. East European Accessions, Vol. 6, May 1957
No. 5

CZECHOSLOVAKIA/Radio Physics - General I-1

Abs Jour : Ref Zhur - Fizika, No 8, 1958, No 18534

Author : ~~Fric Viktor~~
Inst : Not Given
Title : First International Congress in Paris 1956 on Microwave Tubes

Orig Pub : Slaboproudy obzor, 1957, 18, No 11, 764-769

Abstract : Survey article, devoted to microwave tubes and based on the published materials of the First International Congress in Paris in 1956. Bibliography, 100 titles.

Card : 1/1

83373

2/037/60/000/005/004/056
E192/E382

Evaluation of the Fundamental Methods of Tuning the Magnetrons from the Point of View of Efficiency and Frequency Stability they operate with low "parameters".

ASSOCIATION: Výzkumný ústav pro vakuovou elektrotechniku, Praha (Research Institute for Vacuum Electrotechnology, Prague)

Card 2/2

Z/039/60/021/08/005/032
E140/E563

AUTHOR: Frič, Viktor

TITLE: Increasing Magnetron Efficiency by Ferrite Isolators

PERIODICAL: Slaboproudý obzor, 1960, Vol 21, No 8, pp 468-473

ABSTRACT: The article examines the theoretical increase of magnetron efficiency resulting from the use of ferrite isolators, which eliminate load variation influence on the magnetron parameters. In a numerical example an increase from 41 to 58 percent was found.
There are 9 figures and 9 references, 3 of which are Czech, 1 Soviet and 5 English.

ASSOCIATION: Výzkumný ústav pro vakuovou elektrotechniku
(Research Institute for Vacuum Electrical Engineering)

SUBMITTED: January 29, 1960

Card 1/1

FRIC, Viktor; DOHNALEK, Jarmil; STARY, Zdenek, inz.

Magnetron 60 SA 51 for industrial use. Sbor vak elektrotech 3:36-51 '61.

1. Vyzkumny ustav pro vakuovou elektrotechniku, Praha.

FRIC, Viktor

Evaluation of principal methods of magnetron tuning from the viewpoint of their efficiency and frequency stability. Stor vak elektrotech 3:52-61 '61.

1. Vyzkumny ustav pro vakuovou elektrotechniku, Praha.

FRIC, Viktor; STARY, Zdenek, inz.

Contribution to the design of magnetron output transformers.
Sbor vak elektrotech 3:62-73 '61.

27109
Z/039/61/022/008/004/007
D260/D303

9.4110 (1003, 1105, 1144)

AUTHOR: Frič, Viktor

TITLE: On the significance of a high vacuum in microwave tubes and methods of its production

PERIODICAL: Slaboproudý obzor, v. 22, no. 8, 1961, 476-479

TEXT: The performance, stability and life of microwave tubes depend to a large extent on maintaining a high vacuum in them. Modern evacuation methods and devices permit attaining and maintaining a vacuum better than 10^{-8} - 10^{-9} mm Hg. The article describes the principle and performance of the following devices: 1) The conventional evacuation system consisting of a forepump and a diffusion pump; 2) A US electronic cold-cathode ultra-high vacuum pump; 3) The French PV S 11 electronic heated-cathode vacuum pump; 4) A French miniature heated-cathode vacuum pump. In Czechoslovakia, the katedra elektroniky a vákuovej fyziky Karlovej univerzity (Chair of Electronics and Vacuum Physics, Charles University) has

Card 1/3

On the significance of a high vacuum...

built several modifications of small, glass elements with titanium evaporation designed for producing very high vacua in systems previously evaculated by the convential forepump-diffusion pump system, which were described by L. Eckertová, L. Kryška, L. Pátý and P. Schürer (Ref. 18: Čerpací elementy s vypařovaným titanem (Pumping Elements with Titanium Evaporation), Čs. čas. fys. 10, 1960, no. 5, 443-447). They operate on the principle of gas gettering by evaporated titanium. In one of these elements, the titanium evaporation takes place in an atmosphere of residual gases partially ionized by the potential between a heated cathode and a titanium rod as an anode, thus increasing the desorption of inert gases. Measurements have shown that residual-gas pressures as low as 4×10^{-8} - 4×10^{-10} can be produced by this element. It is hoped that these elements can also be used for the additional evacuation of smaller microwave tubes. In conclusion it is stated that in addition to their better economy, the main advantage of electronic vacuum pumps is that the pumping process can be interrupted at any time without damaging the tube. There are 4 figures, 1 table and

27109
Z/039/61/022/003/004/007
D260/D303

On the significance of a high vacuum...

18 references: 8 Soviet-bloc and 10 non-Soviet-bloc. The references to the four most recent English-language publications read as follows: E. Brown, J.H. Leck, Desorption of Gas in the Cold Cathode Ionisation Gauge, Brit. Journ. of Appl. Phys., 6, 1955, May, 161-164; N.W.W. Smith, Noise Reduction in Microwave Tubes by Getter Ion Pumping, Abstract in Le Vide 15, 1960, no. 85; S. Wagener, The Use of Getters for the Production of Very High Vacua, Vacuum, III, no. 1, January 1953, 11-23; L.D. Hall, Electronic Ultra-High Vacuum Pump, Rev. of Scient. Instr., 29, 1958, no. 5, 367-370.

ASSOCIATION: Výzkumný ústav vákuové elektroniky, Praha (Research Institute of Vacuum Electronics, Prague)

SUBMITTED: December 7, 1960

Card 3/3

43198
Z/039/62/023/012/003/004
E192/E382

AUTHORS: Fric, Viktor and Dohnálek, Jarmil

TITLE: Principles of dielectric heating at microwaves

PERIODICAL: Slaboproudý obzor, v. 23, no. 12, 1962, 691 - 697

TEXT: The heating power produced in a dielectric having a permittivity ε and loss factor $\tan\delta$, placed in an electric field E of frequency f, is proportional to $E^2 f \varepsilon \tan\delta$. The heating of high-loss, high-permittivity materials is thus comparatively efficient, while for materials of low ε and low $\tan\delta$ it is necessary to employ high E or f; however, neither E nor f can be made very high since high E can result in breakdowns of the dielectric and high f can reduce the field penetration depth into the material. Frequencies ranging from 13 Mc/s to microwaves can be used for the purpose of heating but microwaves are advantageous in many applications. Continuously operating magnetrons are particularly suitable as sources of microwave heating energy and 2 special tubes were designed for this purpose at the Research Institute for Vacuum Electrotechnology at Prague. The first magnetron, type 30[illegible]51, operates at 2575 ± 50 Mc/s and gives a

Card 1/3

Principles of ....

4/039/62/023/012/003/004
F192/F382

continuous power of 260 W, its supply voltage 4 ... kV and anode current 0.4 ...; the saturation magnetic field 1 1150 G. The other magnetron, type 6M251, also operates at the same frequency and has a coaxial antenna output; its maximum anode voltage is 5.5 kV and current 0.8 A. The magnetic field in the gap is 1150 G and the output of the device is 2 kW; the tube is water-cooled at the rate of 50 - 60 l./h. The resonance system of the device consists of 16 resonators with double coupling straps. The microwave dielectric heating sources of this type can be used for warming-up refrigerated food; a special oven with a waveguide, used for this purpose, is shown. . The heaters can also find application in drying grain and other vegetable products, destruction of insects in the grain, pasteurization and sterilization and vulcanization of rubber. A plasma burner operating at 3 500 °C for destroying harmful ingredients in the products of internal-combustion engines can be constructed by using the magnetrons. Human operators have to be suitably protected when operating with microwave heaters. The permissible maximum microwave radiation in the USA is 10 mW/cm^2 while in the Soviet Union it is as low as

Card 2/3

Principles of ....

Z/039/62/023/012/003/004
E192/E382

10 $\mu W/cm^2$ unless the operator is in contact with radiation for less than 20 min when 1 mW/cm^2 is permissible.
There are 9 figures and 3 tables.

ASSOCIATION: Výzkumný ústav pro vakuovou elektrotechniku, Praha (Research Institute for Vacuum Electrotechnology, Prague)

SUBMITTED: May 14, 1962

Card 3/3

Z/037/62/000/005-6/045/049
E140/E520

AUTHOR: Frič, V.

TITLE: Electronic limitation of the high-frequency output power of magnetrons

PERIODICAL: Československý časopis pro fysiku, 12, no.5-6, 1962, 697-709

TEXT: A relation is derived for the stability of the working mode from the conditions of synchronization of the basic components of a high-frequency field and electrons in the neighbourhood of the cathode. The way in which the problem is put shows the influence of the space charge on the upper limit of the magnetic field, at which the magnetron can be operated stably in the π mode. The limiting influence of the space charge and the high-frequency field in the interaction space is included in the common function F, the value of which was determined from an evaluation of the data published on a large number of magnetrons. The conclusions reached can be used with advantage in designing a new magnetron as a criterion of the fundamental possibility of the generation of the required high-frequency output. There are 5 figures.

Card 1/2

Electronic limitation of the ... Z/037/62/000/005-6/045/049
E140/E520

ASSOCIATION: Vyzkumny ustav pro vakuovou elektrotechniku, Praha
(Research Institute for Vacuum Engineering, Prague)

Card 2/2

45696

Z/039/63/024/001/003/006
E192/E382

9.4×10

AUTHOR: Frič, Viktor

TITLE: Practical use of the criterion of electronic limitation of maximum power output in the design of magnetrons

PERIODICAL: Slaboproudý obzor, v. 24, no. 1, 1963, 14 - 18

TEXT: The author found in an earlier work (Čs. čas. pro fys., 12, 1962, 5-6) that stable operation could be achieved in newly designed types of magnetrons up to a certain value of the magnetic field. There was evidence that the upper boundary of the magnetic field was limited electronically due to the space charge and high-frequency field in the interaction space. An attempt is made in the following to show how this limitation criterion can be used in the design of new magnetrons. It was shown in the earlier work that over the whole operating region the magnetron should meet the following condition:

$$\frac{U_a}{U_{a_M}} \leqslant F \frac{N\lambda_\pi}{(N-2)\lambda_v} \qquad (1)$$

Card 1/ 4

if it is furnished with resonance systems consisting of identical resonators and:

$$\frac{U_a}{U_{a_\pi}} \leqq F\,\frac{2N\lambda_\pi}{(N-2)\lambda_v} \qquad (2)$$

when the resonators are "staggered". In these equations, U_a is the anode-operating voltage, U_{a_π} is the threshold voltage for the π-mode, F is a function which expresses the electronic limit for the upper boundary of the magnetic field, N is the number of resonators, λ_π is the resonance wavelength of the π-mode and λ_v the resonance wavelength of the neighbouring mode with the nearest phase velocity. The power-limitation criterion is taken into consideration by the following design approach. First, the threshold voltage for the π-mode is plotted as a function of the magnetic field (using the Hartree formulae) andthe threshold voltage given by Eq. (1) or (2) is also shown. The maximum value of the anode current and voltage can now be determined for any

value of the magnetic field. The dependence of the anode current on the anode voltage is then calculated for various successive values of ΔU_a. The electronic efficiency is evaluated for every calculated value of the anode current and is plotted as a suitable graph. The high-frequency power generated by the electrons is then calculated for each successive value of the anode voltage and the corresponding anode current. The amplitude of the high-frequency voltage at the anode can be calculated for each successive value U_a. The resulting values of the high-frequency anode voltage can be calculated for radii given by:

$$r_s = \sqrt{\frac{r_k^2}{1 - 1.14 \times 10^{-7} \frac{\omega}{n} \frac{1}{H}}} \quad [\text{cm; oe}] \qquad (6) .$$

It is now possible to plot a function $U = U_a + U_{vf}$ as a function of the anode voltage U_a or the anode current I_a. Such a graph gives the maximum theoretical anode voltage and current and thus

Practical use of ....

Z/059/63/024/001/003/006
E192/E382

permits evaluation of the maximum high-frequency power. A numerical example of using this approach in the design of a 2 kW magnetron is given. There are 6 figures.

ASSOCIATION: Výzkumný ústav pro vakuovou elektrotechniku, Praha (Research Institute for Vacuum Electrical Engineering, Prague)

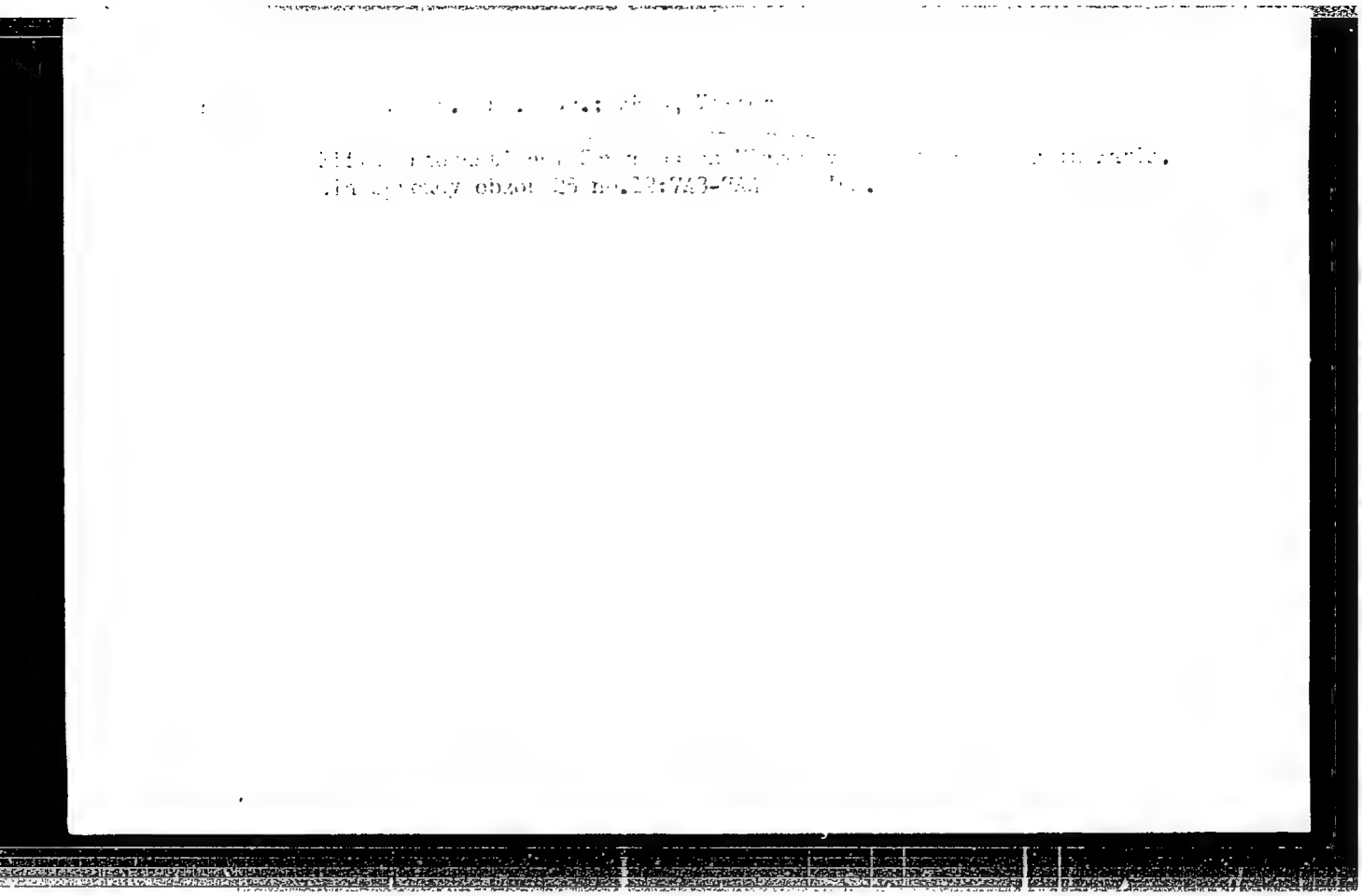
SUBMITTED: June 26, 1962

Card 4/4

FRICH, V. [Fric, V.]

Limitation of the operating parameters of magnetrons determined by the special features of the interaction of electrons with a high-frequency field. Radiotekh. i elektron. 9 no.8:1386-1398 Ag '64. (MIRA 17:10)

1. Issledovatel'skiy institut vakuumnoy elektrotekhniki, Praga.



FRIC, Viktor

Determining the value of the F function limiting the upper electronic threshold of the magnetic field of magnetrons. Sbor vak elektrotech 4:16-25 '64.

1. Research Institute of Vacuum Electrical Engineering, Prague.

FRICEK, J.

FRICEK, J. General repairs of tractors with wheels in the district repair shop of machine-tractor stations in Plzen. (To be cont.) p. 11. S. B. Correct standardization of work in the repair shops of machine-tractor stations. p. 15.

Vol. 7, no. 1, Jan. 1957
MECHANISACE ZEMEDELSTVI
AGRICULTURE
Czechoslovakia

So: East European Accession, Vol. 6, No. 5, May 1957

FRICEK, J.

FRICEK, J. General repairs of tractors wi h wheels in the district repair shop of machine-tractor stations in Plzen. (To be contd.) p. 39.

Vol. 7, no. 2, Jan. 1957
MACHANISACE ZEMEDELSTVI
AGRICULTURE
Czechoslovakia

So: East European Accession, Vol. 6, No. 5, May 1957

FRICH

Category : CZECHOSLOVAKIA / Radio Physics. Generation and Conversion of I-4
Radio-Frequency Oscillations.

Abs Jour : Ref Zhur - Fizika No 3, 1957, No 7255

Author : Frich
Title : Calculation of Fundamental Parameters of the Resonant System of a Magnetron

Orig Pub : Slaboproudny obzor, 1956, 17, No 8, 430-438

Abstract : Relations are derived for the calculation of the fundamental parameters of the magnetron. A summary of the fundamental rules that must be observed in the calculation of a new resonant system of magnetrons is given.

Card : 1/1 - 16 -

FRICH, I., Cand Med Sci, "Forms and methods of training physicians in the USSR and in Chechoslovakia." Leningrad, 1961. (First Leningrad Med Inst im Acad I. P. Pavlov, Chair of Organization of Public Health). (KL, 2-61, 220).

FRICH, T.

New method of pneumography. Gig. i san. 23 no.5:77-79 My '58
(MIRA 11:6)

1. Iz Klujskogo nauchno-issledovatel'skogo gigiyenicheskogo instituta, Rumynskaya Narodnaya Respublika.
(RESPIRATION, physiol.
pneumography, new method (Rus))

SHTRAUS, Kh.; LENGEL, I.; FRICH, T.

Influence of air pollution from cement dust on the body and public health. Trudy LSGMI no.5[illegible]:102-112 '60. (MIRA 14:11)
(RUMANIA--AIR POLLUTION) (RUMANIA--PUBLIC HEALTH)

ACCESSION NR: AP4043672 S/0109/64/009/008/1386/1398

AUTHOR: Frich, V.

TITLE: Limitations of operating parameters of magnetrons imposed by the peculiarities of the interaction of electrons with a high-frequency field

SOURCE: Radiotekhnika i elektronika, v. 9, no. 8, 1964, 1386-1398

TOPIC TAGS: magnetron, magnetron theory, electron interaction, electron field interaction, space charge, space charge distribution

ABSTRACT: This is a continuation of the author's theoretical work whose results were reported before the Second Czechoslovakian Conference on Electronics (V. Frič, Českosl. časop. hys., 1962, 12, 4, 697). The author's formulas for the upper operating limit of a magnetron were reported. In the present article, a more accurate derivation of those formulas, based on the similarity of electron trajectories in static and generating magnetrons in the near-cathode region, is submitted. The magnetron upper operating limit is imposed by the distribution of electrons in the boundary layer of the space-charge cloud; a purely Brillouin

Card 1/2

ACCESSION NR: AP4043672

space-charge distribution is assumed. The function F expressing the operating limit is numerically evaluated from the published data on many magnetrons; this function allows for the effects of the space charge and field asymmetry. The numerical values of the function for multicavity (including the rising-sun type) magnetrons with and without strips are given. These conclusions are also offered: (1) The near-cathode electron trajectories in a generating magnetron are similar to those in a static magnetron; (2) The electron distribution in the space-charge cloud corresponds, in the first approximation, to the Brillouin state; (3) The function F may serve for an approximate determination of the thickness of the transient layer of the space-charge cloud in a generating magnetron. Orig. art. has: 7 figures, 22 formulas, and 1 table.

ASSOCIATION: Issledovatel'skiy institut vakuumnoy elektrotekhniki ,Prague (Research Institute of Vacuum Electrical Engineering)

SUBMITTED: 25Aug63 ENCL: 00

SUB CODE: EC NO REF SOV: 003 OTHER: 011

Card 2/2

EAST GERMANY

KILIAS, Adolf, Dr., of the Institute for Special Zoology and Zoological Museum at Humboldt University (Institut fur Spezielle Zoologie und Zoologisches Museum der Humboldt-Universitat)(Director: SENGLAUB (initial(s) not given), Professor, Dr.), and FLICK, Wolfgang, Dr., of the Office for Veterinary Examination and Animal Hygiene (Veterinaruntersuchungs- und Tiergesundheitsamt)(Director: WONSACK (initial(s) not given), Ph. D.) in Berlin and Potsdam, respectively.

"Intermediate-Host Snails of Important Domestic Helminths. Part 1: Functions, Description, and Biology of the Intermediate-Host Snails"

Jena, Angewandte Parasitologie, Vol 4, No 2, Jul 1963, pp 65-99.

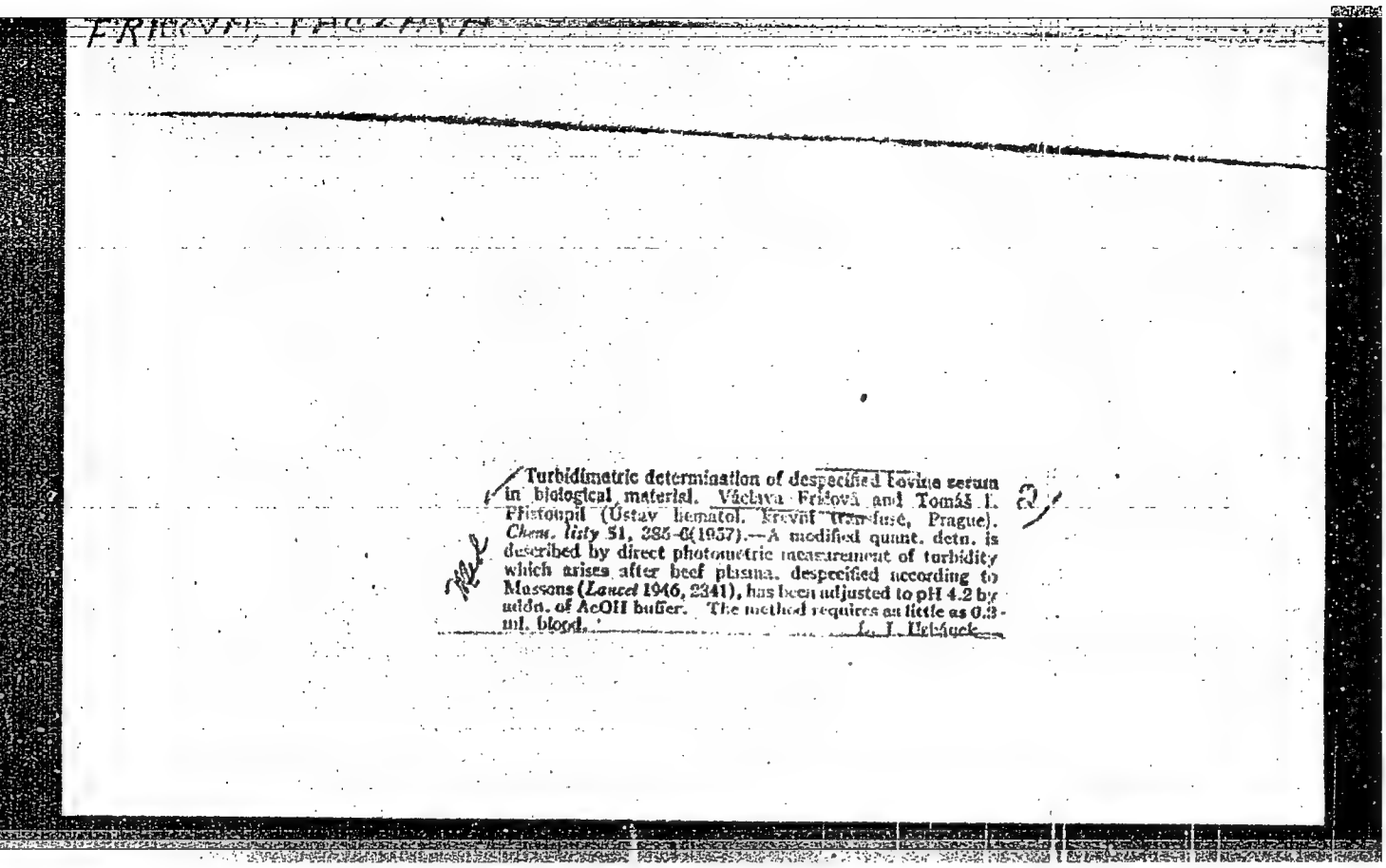
Abstract: The present knowledge of the functions of intermediate hosts in land- and fresh-water-snails in regard to the native helminths of domestic and other useful animals was reviewed. Data on the morphology, diagnosis, occurrence, distribution, reproduction, and nutrition were given for the following: Viviparus contectus, Valvata piscinalis piscinalis, Bithynia tentaculata, Bithynia leachi, Physa fontinalis,

1/1

KAHLICH, R.; FRANEK, J.; FRICOVA, O.

Distribution and activity of β-hemolytic streptococci in newly formed communities. 1. The role of streptococci as the pathogen in acute respiratory diseases. Cesk. epidem. mikrob. imun. 12 no.2 81-87 Mr '63.

1. Vojensky ustav hygieny, epidemiologie a mikrobiologie v Praze
(STREPTOCOCCAL INFECTIONS) (RESPIRATORY TRACT INFECTIONS)



Turbidimetric determination of despecified bovine serum in biological material. Václava Frišová and Tomáš I. Přistoupil (Ústav hematol. krevní transfuse, Prague). *Chem. listy* 51, 285-6(1957).—A modified quant. detn. is described by direct photometric measurement of turbidity which arises after beef plasma, despecified according to Massons (*Lancet* 1946, 2341), has been adjusted to pH 4.2 by addn. of AcOH buffer. The method requires as little as 0.3 ml. blood. L. J. Urbánek

PRISTOUPIL, T.I.; FRICOVA, V.

Some changes in the sulfur groups in modified proteins. Cesk. farm. 12 no.3:134-137 Mr '63.

1. Ustav hematologie a krevni transfuse, Praha.
(BLOOD PROTEINS) (SULFUR) (HEAT) (FORMALDEHYDE)
(HYDROGEN PEROXIDE) (CHEMISTRY) (SULFIDES)

CZECHOSLOVAKIA

V. FRICOVA and T. I. PRISTOUPIL, [Affiliation same as above.]

"Enzymatic Decomposition of Modified Bovine Serum Albumin."

Prague, Ceskoslovenska Farmacie, Vol 12, No 4, May 63; pp 191-193.

Abstract [English summary modified]: Trypsin, chymotrypsin and pepsin hydrolysis of specimens of bovine serum albumin, either native or denatured by heat, formalin, oxidation were studied by biuret and ninhydrin methods. Denatured samples decomposed to a higher degree than native ones. Table, 4 graphs; 3 Czech (1 patent) and 3 Western references.

1/1

[illegible] Ivana FRICOVA, Vlastova

Simple automatic fraction collector. Chem Listy 58 no. 6 667-669 Je '64.

1. Institute of Hematology and Blood Transfusion, Prague.

FRICOVSKY, R.

Cementing in spectacle optics. Jemna mech opt 9 no.4:
117-118 '64.

FRICSOVSZKY, Gyorgy

How do semiconductors work? Term tud kozl 7 no.11:506-509 N'63.

1. Eotvos Lorand Tudomanyegyetem Atomfizikai Tanszeke, Budapest.

KIRSCHNER, Istvan; PAPP, Elemer; FRICSOVSZKY, Gyorgy

Physics of supraconductors. Pt.1. Fiz szemle 13 no.10:311-318 0'63

1. Eotvos Lorand Tudomanyegyetem Atomfizikai Tanszeke.

KIRSCHNER, Istvan; PAPP, Elemer; FRICSOVSZKY, Gyorgy

Physics of supraconductors.Pt.2. Fiz szemle 13 no.11:336-349 N '63.

1. Eotvos Lorand Tudomanyegyetem Atomfizikai Tanszeke.

KIRSCHNER, Istvan; PAPP , Elemer; FRICSOVSZKY, Gyorgy

Physics of supraconductors, Pt.3. Fiz szemle 13 no.12: 379-384 D'63.

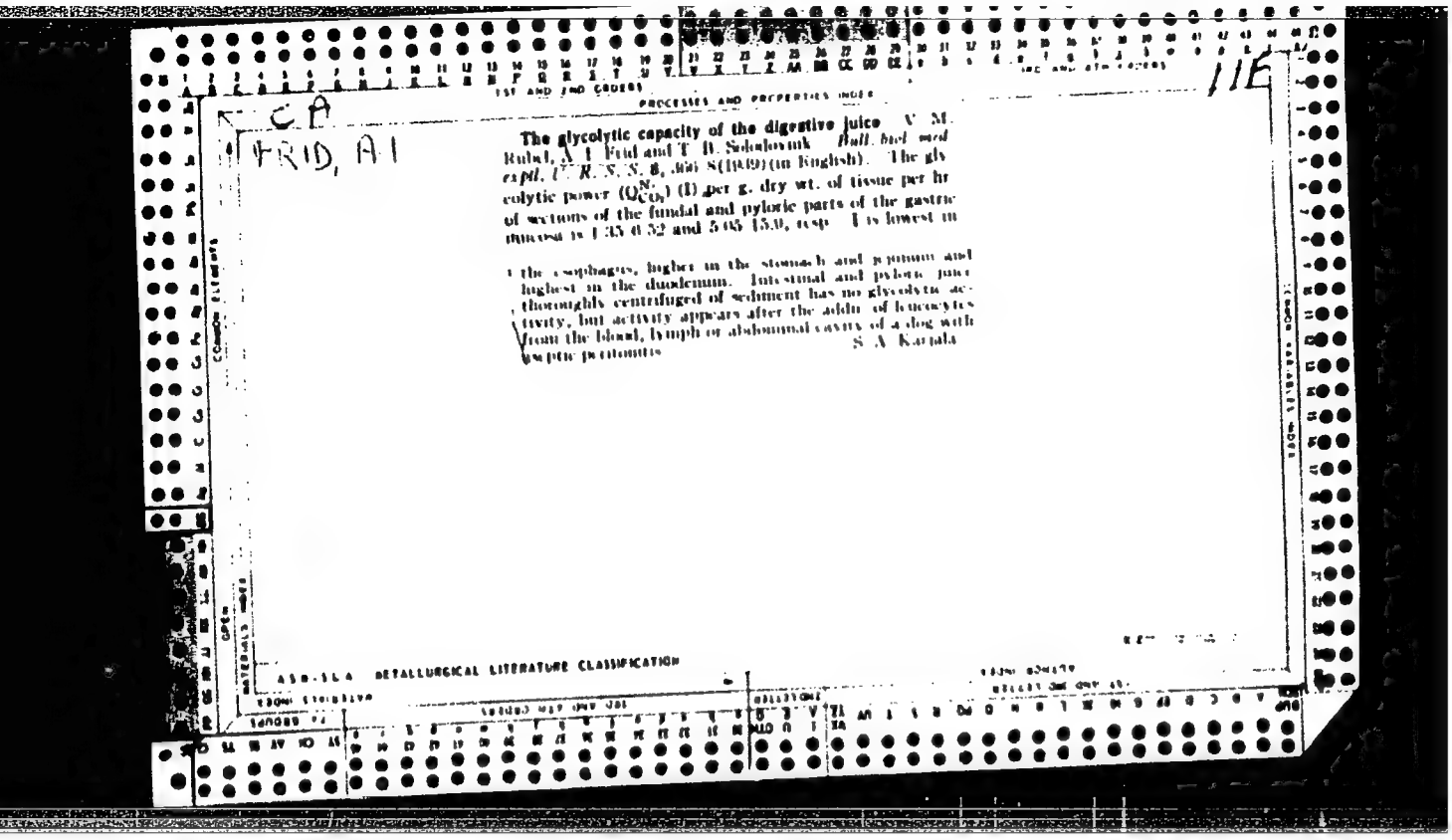
1. Eotvos Lorand Tudomanyegyetem Atomfizikai Tanszeke.

FRID, A.A.

CARD 1 / 2 PA - 1689

SUBJECT USSR / PHYSICS
AUTHOR KLJARFEL'D,B.N., FRID,A.A.
TITLE A Filamentlike Anode in a Gas Discharge.
PERIODICAL Žurn.techn.fis, 26, fasc.11, 2541-2547 (1956)
Issued: 12 / 1956

Here the experimental investigation of the ignition mechanism of the discharge in a long discharge tube along the axis of which a thin wire is drawn, is described. The application of a potential, which is positive with respect to the cathode, to the filament causes a discharge luminescence on the surface of the filament as well as the instant ignition of the discharge between the main electrodes. In mercury vapors (p = 0,001 mm torr in the case of discharge currents of the order from 10^{-5} to 10^{-3} ampères on the filament) a weak luminescence extends over the surface of the filament to the extent of up to 75 cm. However, a reliable discharge is attained only if the discharge tube is not very long. That portion of the filament which is next to the cathode is the anode of the independent discharge. The remaining part of the filament collects the electrons which are propagated from the domain of the independent discharge. These electrons penetrate into the cylindrical field between the walls of the tube and the field, describe several circles round the filament, and then impinge upon the filament. Near the filament the electrons have the highest kinetic energy and ionize the gas intensely. On this occasion a noticeable concentration of electrons and positive ions is brought about in



CA

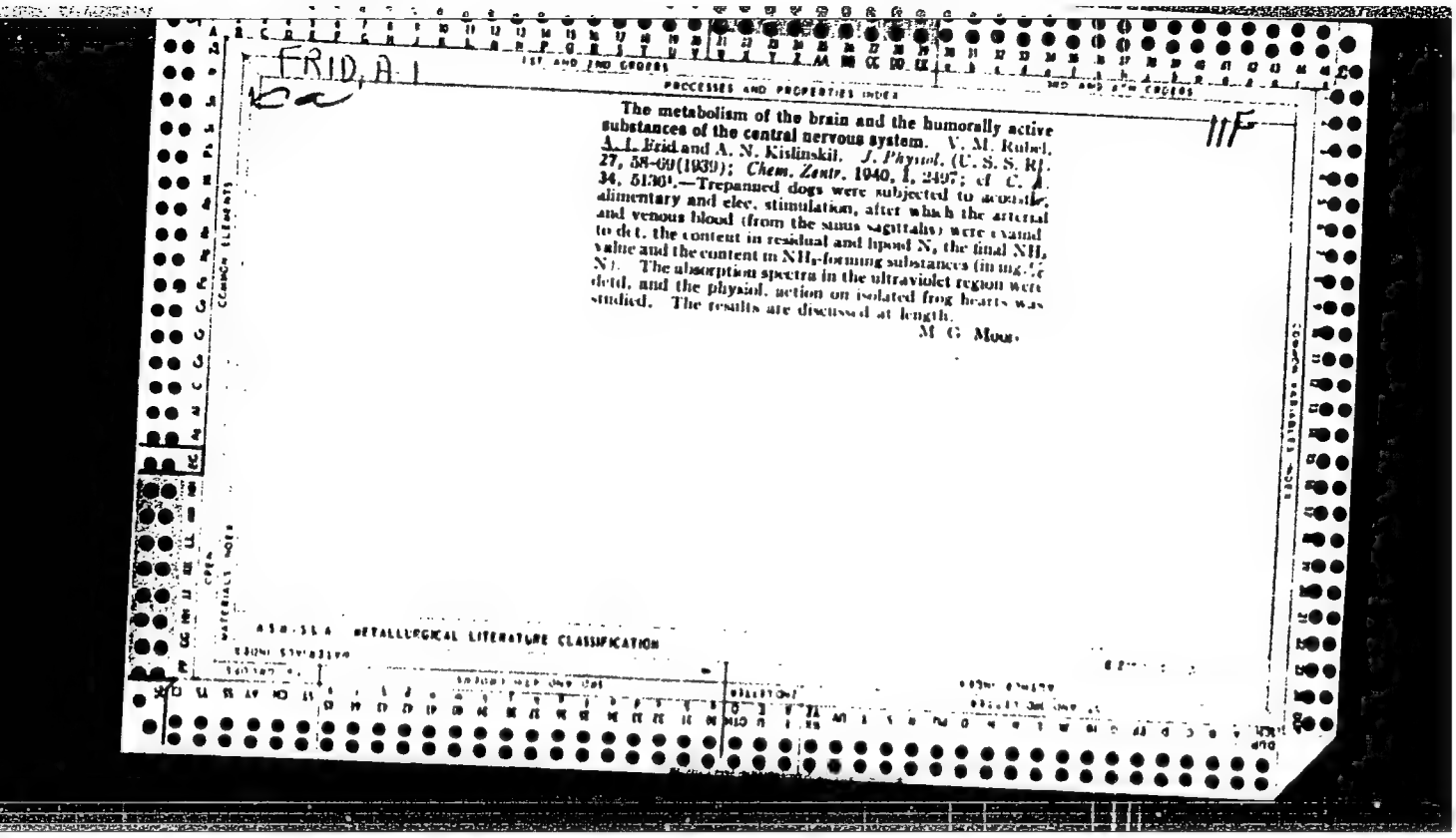
FRID, A I

PROCESSES AND PROPERTIES INDEX

The glycolytic capacity of the digestive juice V. M. Rubal, A. I. Frid and T. B. Sokolovnik *Bull. biol. med. exptl. U.R.S.S.* 8, 450 8(1939)(in English). The glycolytic power ($Q_{CO_2}^{N_2}$) (I) per g. dry wt. of tissue per hr of sections of the fundal and pyloric parts of the gastric mucosa is 1.35 0.52 and 5.05 15.0, resp. I is lowest in the oesophagus, higher in the stomach and pylorus and highest in the duodenum. Intestinal and pyloric juice thoroughly centrifuged of sediment has no glycolytic activity, but activity appears after the addn. of leucocytes from the blood, lymph or abdominal cavity of a dog with aseptic peritonitis. S. A. Karpla

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

11E



FRID, A. I

Ka

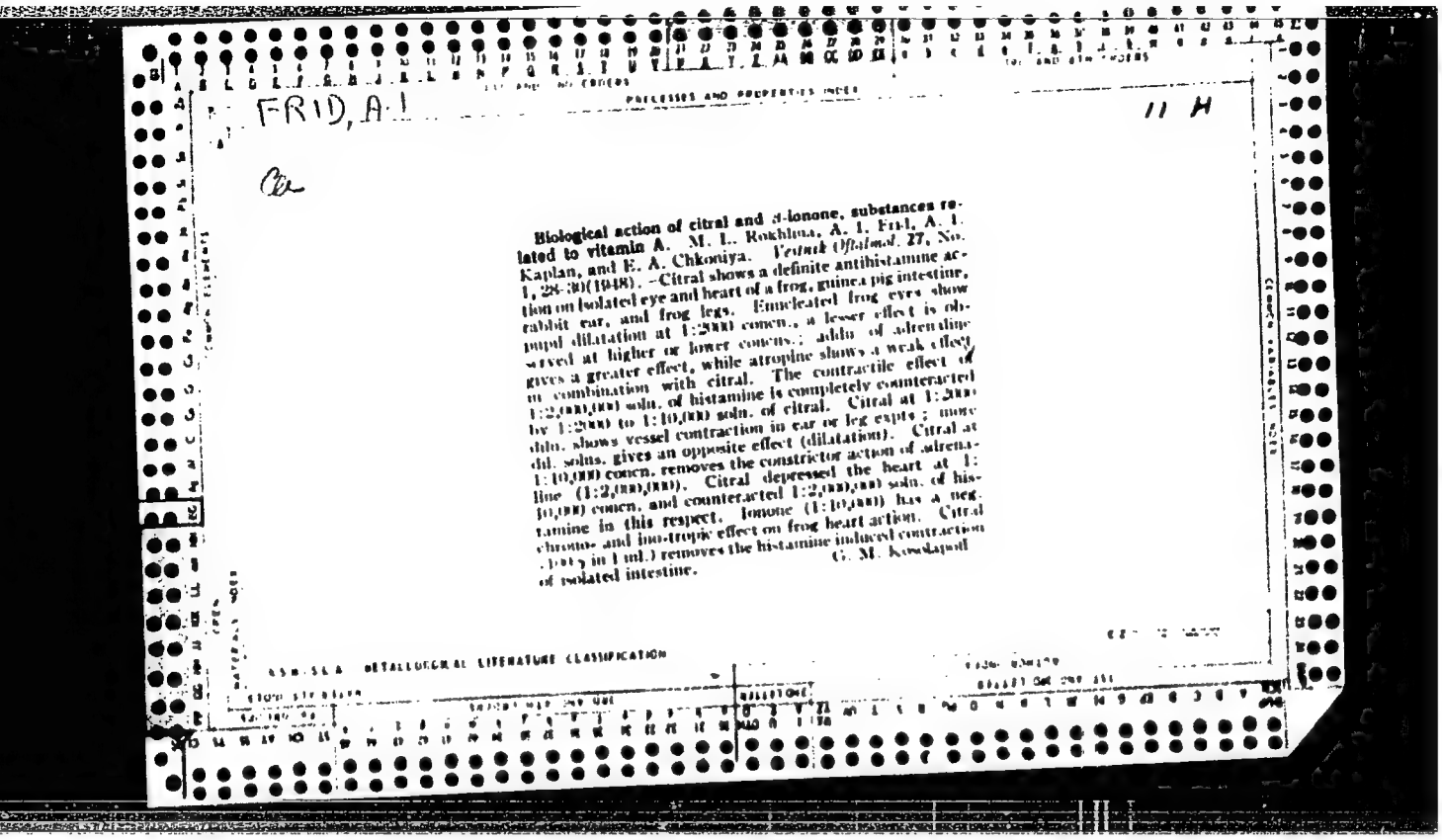
PROCESSES AND PROPERTIES INDEX

IIF

The metabolism of the brain and the humorally active substances of the central nervous system. V. M. Rubel, A. I. Frid and A. N. Kislinskii. *J. Physiol.* (U. S. S. R.) 27, 58–69(1939); *Chem. Zentr.* 1940, I, 2497; cf. *C. A.* 34, 5130¹.—Trepanned dogs were subjected to acoustic, alimentary and elec. stimulation, after which the arterial and venous blood (from the sinus sagittalis) were examd. to det. the content in residual and lipoid N, the final NH_3 value and the content in NH_3-forming substances (in mg.-% N). The absorption spectra in the ultraviolet region were detd. and the physiol. action on isolated frog hearts was studied. The results are discussed at length.

M. G. Moos.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



FRID, A.I

11 H

Biological action of citral and β-ionone, substances related to vitamin A. M. I.. Rokhlina, A. I. Frid, A. I. Kaplan, and E. A. Chkoniya. *Vestnik Oftalmol.* 27, No. 1, 28-30(1948).—Citral shows a definite antihistamine action on isolated eye and heart of a frog, guinea pig intestine, rabbit ear, and frog legs. Enucleated frog eyes show pupil dilatation at 1:2000 concn.; a lesser effect is observed at higher or lower concns.; addn. of adrenaline gives a greater effect, while atropine shows a weak effect in combination with citral. The contractile effect of 1:2,000,000 soln. of histamine is completely counteracted by 1:2000 to 1:10,000 soln. of citral. Citral at 1:2000 dilu. shows vessel contraction in ear or leg expts.; more dil. solns. gives an opposite effect (dilatation). Citral at 1:10,000 concn. removes the constrictor action of adrenaline (1:2,000,000). Citral depressed the heart at 1:10,000 concn. and counteracted 1:2,000,000 soln. of histamine in this respect. Ionone (1:10,000) has a negative chrono- and ino-tropic effect on frog heart action. Citral (1:10 in 1 ml.) removes the histamine induced contraction of isolated intestine.

G. M. Kondakpol

FRID, A.I.

1292. THE CONTENT OF HYALURONIC ACID IN THE FLUID OF THE ANTERIOR CHAMBER OF THE EYE IN GLAUCOMA AND CATARACT (Russian text) - Frid A.I. - SBORN.INFORM.-METOD.MATERIAL.INST. 1956, 4(16-18).

The content of hyaluronic acid in the fluid of the anterior chamber of the eye was determined in patients with glaucoma, using as a control the fluid from the anterior chamber of patients with cataract. The content of hyaluronic acid was determined by the method of nephelometry using a Spekker photoelectric absorption meter. In patients with cataract, the content of hyaluronic acid was on the average 0.052 mg./1 ml. In patients with absolute glaucoma, in both the stage of development and in long-standing conditions, there was an increase in the content of hyaluronic acid (on the average 141.8 mg./0.1 ml.). In early stages of the disease and in secondary glaucoma, no increase in the content of hyaluronic acid in the anterior chamber fluid was observed. The author connects disturbance of the hyaluronic acid enzyme system - hyaluronidase - in glaucoma patients with a diminution in the amount of acetylcholine. (S)

BERENSHTEYN-KECHKER, R.A.; FRID, A.I.

Role of the central nervous system in the regulation of intraocular pressure in X-ray therapy for glaucoma. Trudy TSentr. nauch.-issl. inst. rentg. i rad. 10:357-366 '59. (MIRA 12:9)
(GLAUCOMA) (X RAYS--THERAPEUTIC USE)
(INTRAOCULAR PRESSURE) (NERVOUS SYSTEM)

FRID, A. M.

"Investigation of the Process Governing the Occurrence and Development of Cavitation in Hydroturbines." Cand Tech Sci, Khar'kov Polytechnic Inst imeni Lenin, Min Higher Education USSR, Khar'kov, 1954. (KL, No 2, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)
SO: Sum. No. 556, 24 Jun 55

28(2) SOV/32-25-5-34/56

AUTHORS: Epshteyn, V. L., Frid, A. M.

TITLE: On the Computation of Statistical Characteristics on Punched Card Computers (O vychislenii statisticheskikh kharakteristik na schetnoperforatsionnykh mashinakh)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 5, pp 613-616 (USSR)

ABSTRACT: The use of punched card computers (PC) in practice is usually limited to assortment and grouping and a compilation of frequency characteristics on the tabulators. The analysis of the mathematical structure of statistical characteristics (Table) shows that the latter may be divided into two groups with respect to computation: the first group comprises operations, as the summation of a larger number of data, the computation of the sum of products (including the sum of squares) and various operations of grouping; the second group covers division, extraction of roots etc. Thus, the first group is a comprehensive one, whereas the second group comprises operations which are carried out according to data obtained by operations of the first group. On this basis a uniform scheme is worked out for the present case for the purpose of adjusting the tabulator

Card 1/2

On the Computation of Statistical Characteristics on Punched Card Computers

T-5, which comprises the entire complex of mass computations in the course of statistical investigations; this is done by the method of series of numbers (Ref 1). Three diagrams are given in a table. There are 1 table and 1 Soviet reference.

ASSOCIATION: Stal'proyekt (Stal'proyekt)

FRid, AM

AID Nr. 982-15 4 June

CAVITATION DAMAGE IN MATERIALS (USSR)

Frid, A. M. Izvestiya vysshikh uchebnykh zavedeniy. Aviatsionnaya tekhnika, no. 1, 1963, 126-130. S/147/63/000/001/014/020

Measurements were made of cavitation damage (weight loss) caused by the impact erosion of a water jet with a velocity of 4 m/sec impinging periodically on aluminum, electrolytic copper, and magnesium specimens which were rotated at a peripheral speed of 45 m/sec in a closed vessel whose air pressure was varied from 760 to 260 mm Hg. It was found that maximum weight loss in each metal occurs at a definite critical air pressure: 630, 525, and 440 mm Hg for aluminum, magnesium, and copper, respectively. Weight loss at critical pressure is 3 to 5 times higher than at atmospheric pressure. Similar results were obtained with aluminum subjected to ultrasound-induced cavitation; a maximum weight loss occurred when the weight of the air dissolved in water (and, consequently, in the microcracks of the specimens) at -50°C was about the same as that of the air dissolved in water at 630 mm Hg and 20°C, which is the point at

Card 1/2

AID Nr. 982-15 4 June

CAVITATION DAMAGE IN MATERIALS [Cont'd]

S/147/63/000/001/014/020

which maximum weight loss occurred with impact-erosion cavitation. The results seem to support the author's hypothesis that cavitation damage of materials is caused by the presence of air-filled microcracks and pores on the surface of the specimen. The water pressed into microcracks at the moment of jet impact is compressed and instantaneously heats the air in the microcracks and pores to a high temperature. Intense corrosion, and, possibly, chemical reactions, and even melting take place on the microcrack walls under high temperature. The pressure drops as the specimen passes the jet; the liquid and highly compressed vapors are ejected from the microcracks of the pores causing intense erosion of microcrack surfaces. The increase in temperature depends on the compression ratio, and the amount of damage depends on the weight of the air in the microfissures. This explains the maxima on weight loss-pressure curves. Generally, cavitation damage depends not only on the hardness and strength of the microscopic volumes of the material, but also on its melting temperature, heat resistance, and high-temperature corrosion resistance.

[MS]

Card 2/2

L 00028-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5020312 UR/0186/65/007/004/0496/0498

532.72:546.42:631.4

AUTHOR: Prokhorov, V. M.; Frid, A. S.

TITLE: The effect of salt concentration in soil solutions on the rate of diffusion of microquantities of strontium in the soil

SOURCE: Radiokhimiya, v. 7, no. 4, 1965, 496-498

TOPIC TAGS: soil, diffusion, strontium-90

ABSTRACT: The purpose of this investigation was to measure directly the effect of the composition of the soil solution on the rate of diffusion of radioactive isotopes in the soil. The experiments were conducted with Sr-90 without a carrier. The soil (37 m^2/g, specific surface) was wetted with concentrations of $CaCl_2$ solutions ranging from $3.3\ 10^{-2}$ to 8.5 g-equiv/l. The soil was moistened to the extent of 30% by weight. To correct for adsorption of Ca^{++} by soil the equilibrium concentration of $CaCl_2$ was determined by complexometric titration. The diffusion coefficient of strontium-90 as a function of the concentration of Ca^{++} is shown in the figure (Enclosure 01). In the concentration range 4.10^{-3} - $5.8\ 10^{-1}$ N the diffusion coefficient of strontium increases by approximately a factor of 10. From 0.6 to

Card 1/3

L 00028-66
ACCESSION NR: AP5020312

2

6.6 N the diffusion coefficient remains practically constant. The data presented may be useful in estimating the migration of Sr-90 in soil from radioactive wastes with large salt concentration. The authors wish to express their gratitude to M. K. Mel'nikova for her interest in this work and to A. F. Batygin for his help in carrying out experiments. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: none

SUBMITTED: 27Nov64 ENCL: 01 SUB CODE: NP, LS

NO REF SOV: 004 OTHER: 001

Card 2/3

L 00028-66
ACCESSION NR: AP5020312

ENCLOSURE: 01

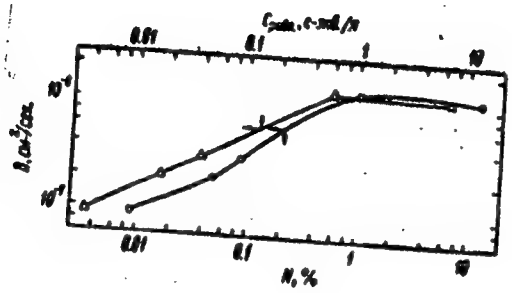
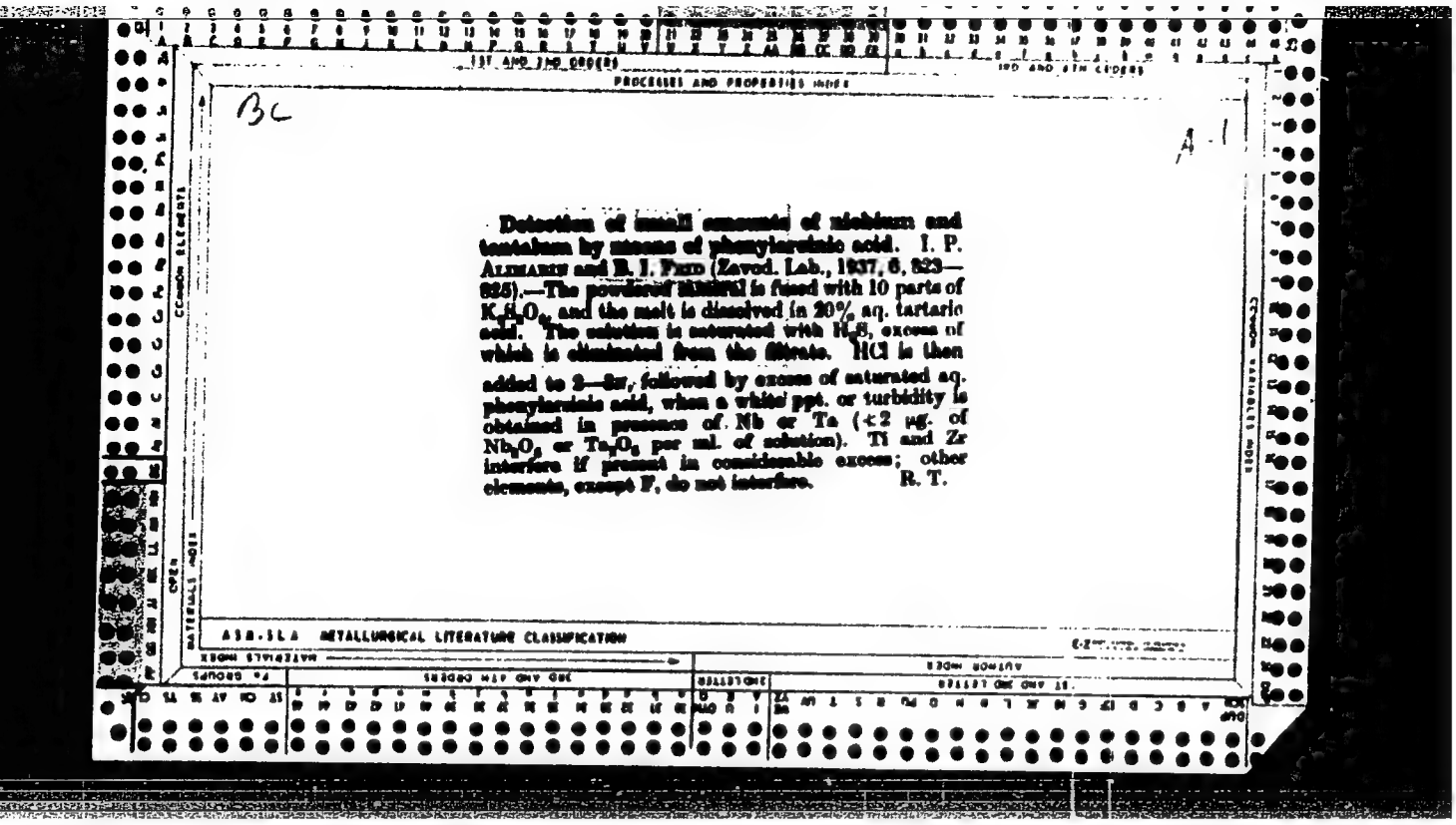


Fig. 1. Diffusion coefficient of Sr-90 in soil as a function of the concentration of Ca^{+2}.
C_{eq} -- concentration of Ca^{+2} in an equilibrium soil solution (g-equiv/l);
N -- total concentration of calcium in soil, recalculated to $CaCl_2$ (in % of the weight of dry soil).

Card 3/3

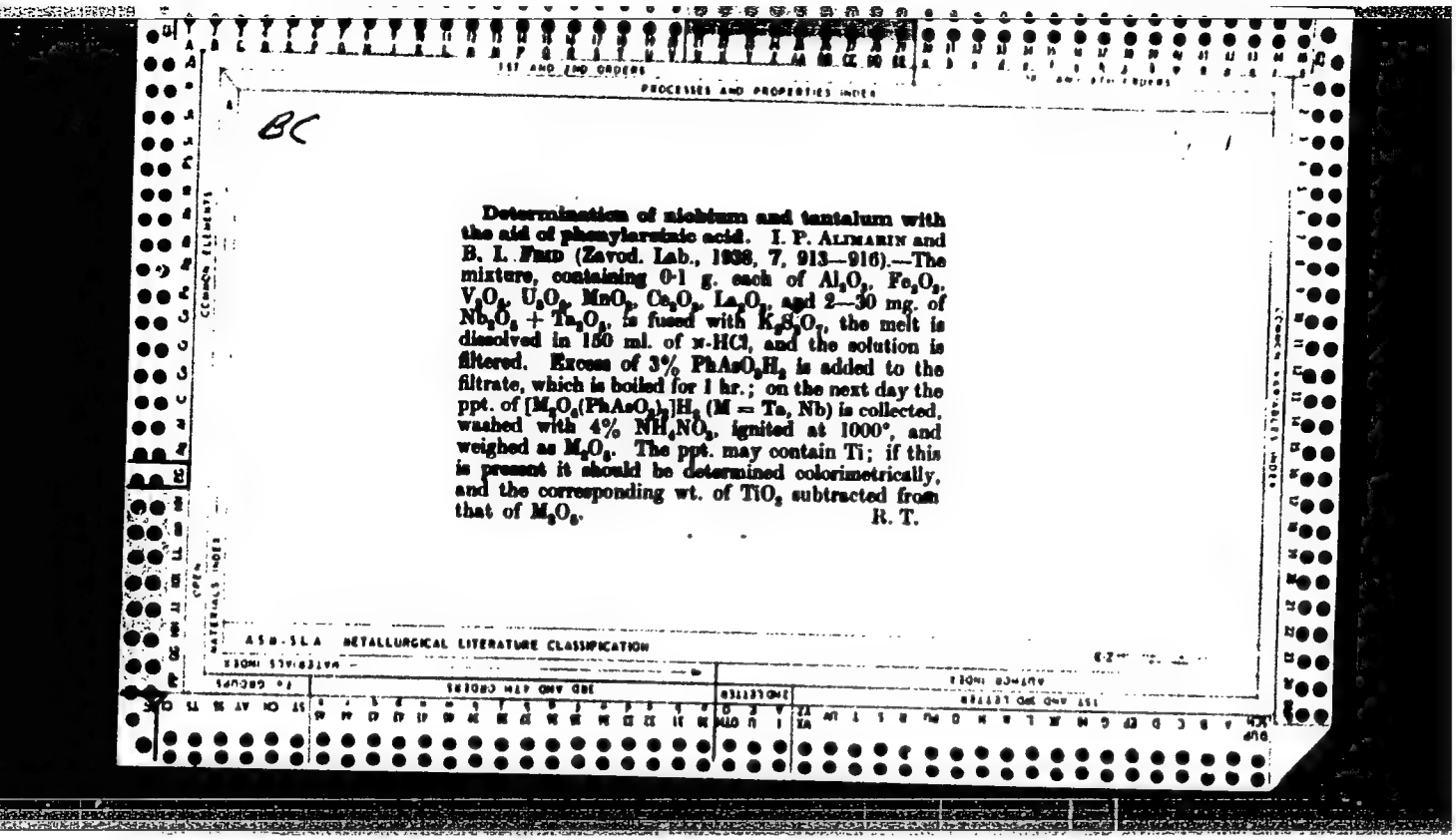


Bc

A-1

Detection of small amounts of niobium and tantalum by means of phenylarsinic acid. I. P. Alimarin and B. I. Fedo (Zavod. Lab., 1937, 6, 823—825).—The powdered mineral is fused with 10 parts of $K_2S_2O_7$, and the melt is dissolved in 20% aq. tartaric acid. The solution is saturated with H_2S, excess of which is eliminated from the filtrate. HCl is then added to 2—3*N*, followed by excess of saturated aq. phenylarsinic acid, when a white ppt. or turbidity is obtained in presence of Nb or Ta (< 2 µg. of Nb_2O_5 or Ta_2O_5 per ml. of solution). Ti and Zr interfere if present in considerable excess; other elements, except F, do not interfere. R. T.

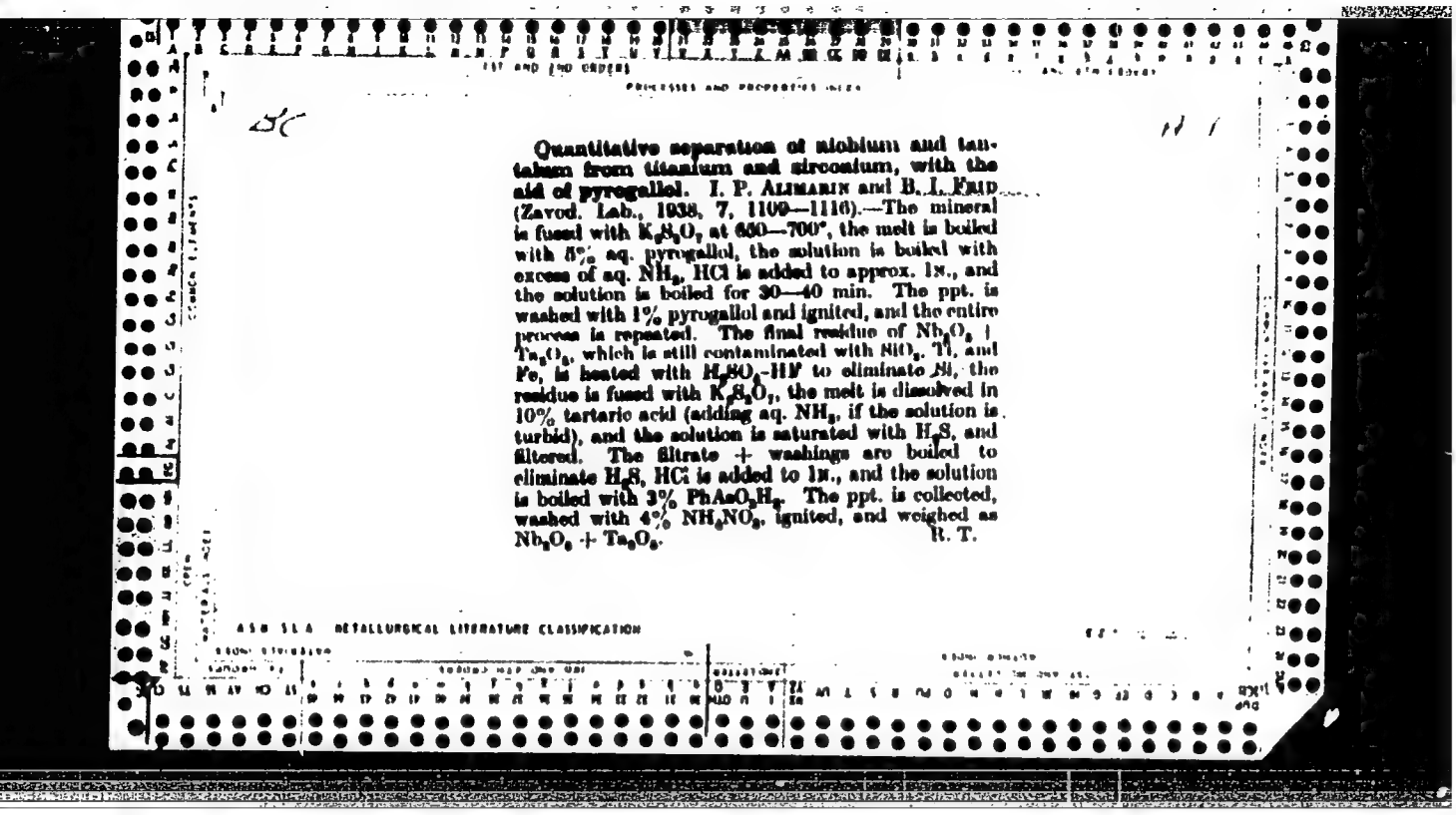
A 38-3 L A METALLURGICAL LITERATURE CLASSIFICATION



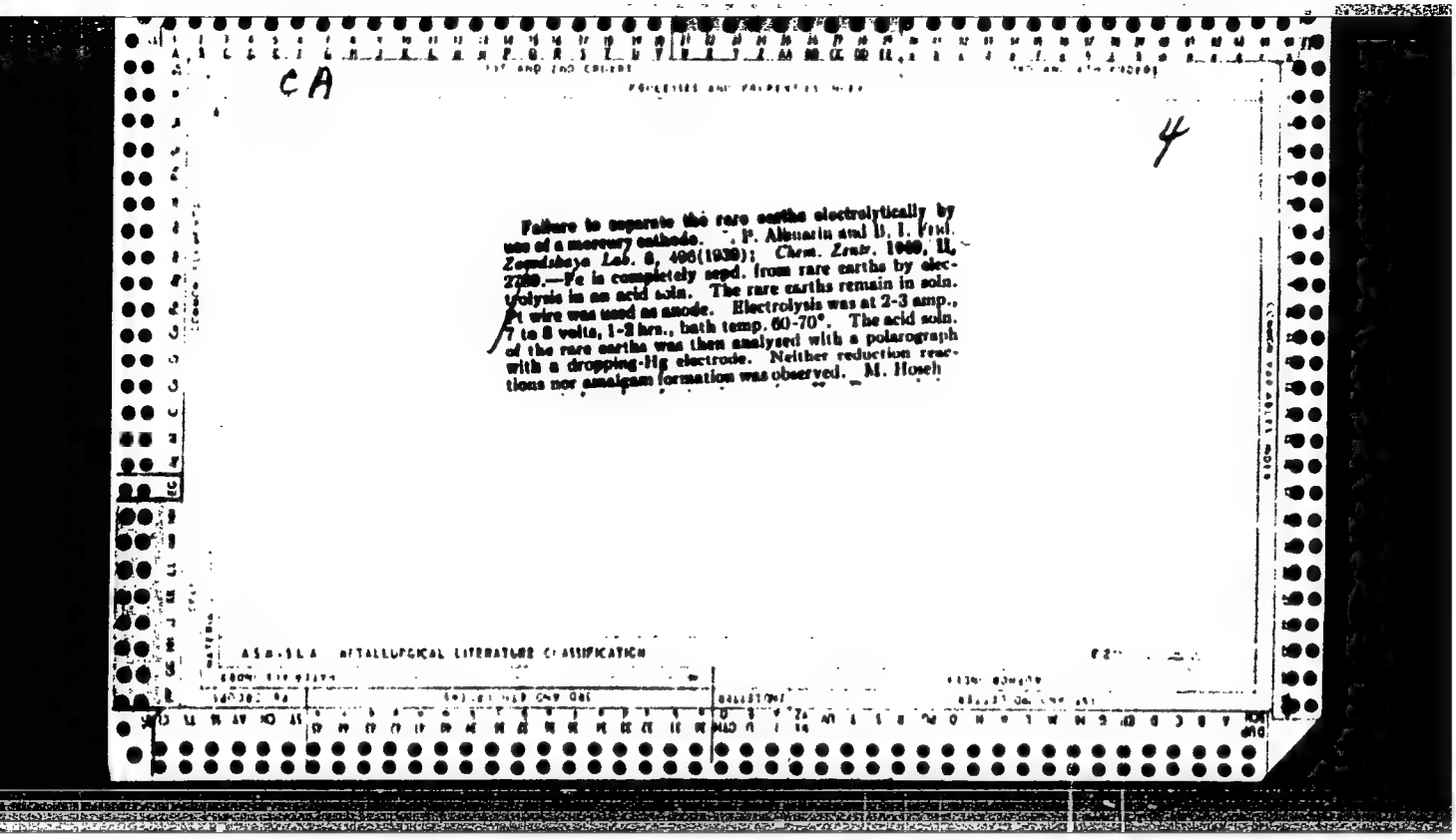
BC

Determination of niobium and tantalum with the aid of phenylarsinic acid. I. P. Alimarin and B. I. Fred (Zavod. Lab., 1938, 7, 913—916).—The mixture, containing 0·1 g. each of Al_2O_3, Fe_2O_3, V_2O_5, U_3O_8, MnO_2, Ce_2O_3, La_2O_3, and 2—30 mg. of $Nb_2O_5 + Ta_2O_5$, is fused with $K_2S_2O_7$, the melt is dissolved in 150 ml. of N-HCl, and the solution is filtered. Excess of 3% $PhAsO_3H_2$ is added to the filtrate, which is boiled for 1 hr.; on the next day the ppt. of $[M_2O_5(PhAsO_3H_2)]H_2$ (M = Ta, Nb) is collected, washed with 4% NH_4NO_3, ignited at 1000°, and weighed as M_2O_5. The ppt. may contain Ti; if this is present it should be determined colorimetrically, and the corresponding wt. of TiO_2 subtracted from that of M_2O_5.

R. T.



Quantitative separation of niobium and tantalum from titanium and zirconium, with the aid of pyrogallol. I. P. ALIMARIN and B. I. FRID (Zavod. Lab., 1938, 7, 1109—1116).—The mineral is fused with $K_2S_2O_7$ at 650—700°, the melt is boiled with 5% aq. pyrogallol, the solution is boiled with excess of aq. NH_3, HCl is added to approx. 1N., and the solution is boiled for 30—40 min. The ppt. is washed with 1% pyrogallol and ignited, and the entire process is repeated. The final residue of Nb_2O_5 + Ta_2O_5, which is still contaminated with SiO_2, Ti, and Fe, is heated with H_2SO_4–HF to eliminate Si, the residue is fused with $K_2S_2O_7$, the melt is dissolved in 10% tartaric acid (adding aq. NH_3, if the solution is turbid), and the solution is saturated with H_2S, and filtered. The filtrate + washings are boiled to eliminate H_2S, HCl is added to 1N., and the solution is boiled with 3% $PhAsO_2H_2$. The ppt. is collected, washed with 4% NH_4NO_3, ignited, and weighed as Nb_2O_5 + Ta_2O_5. R. T.

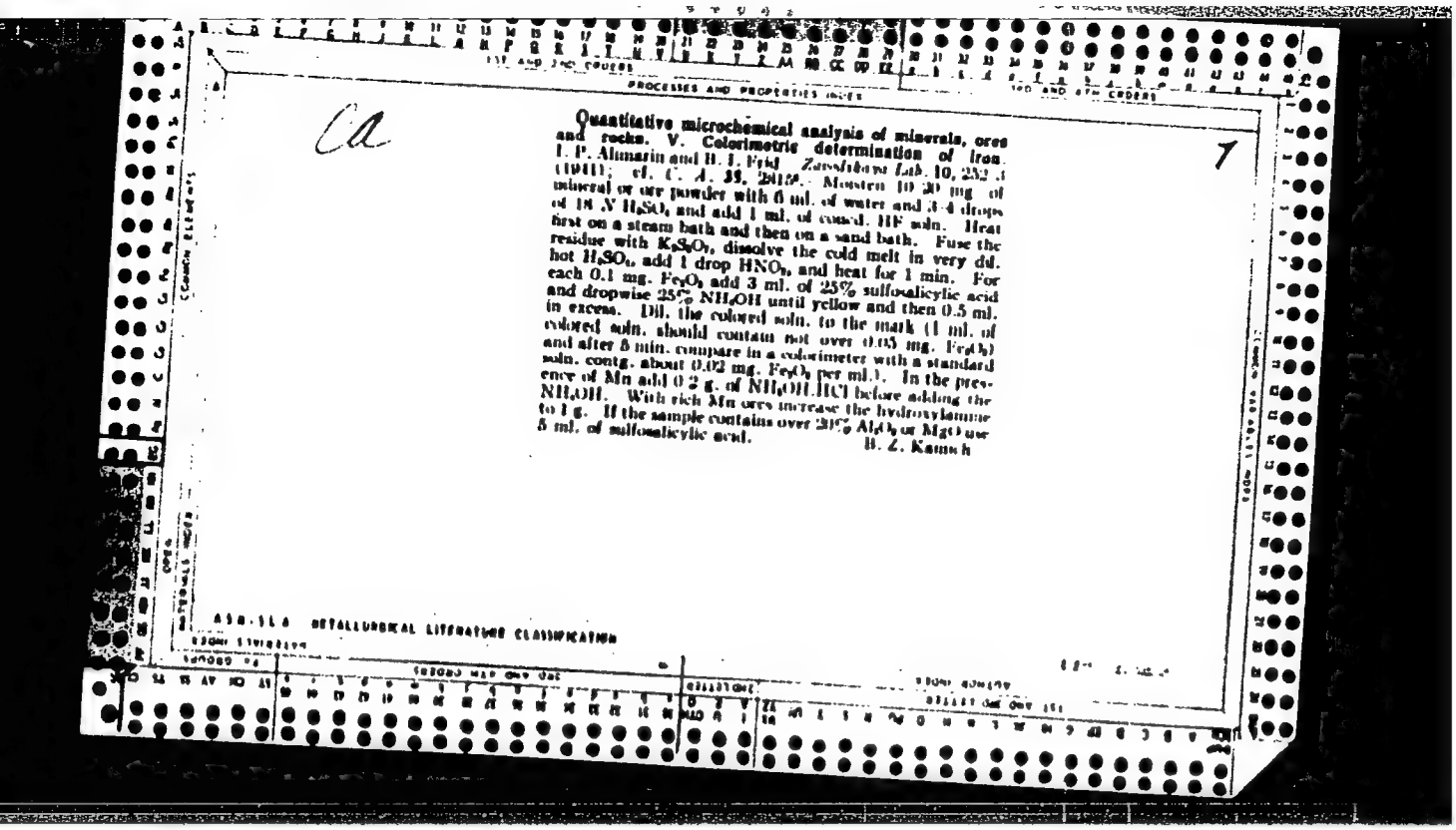


CA

4

Failure to separate the rare earths electrolytically by use of a mercury cathode. — P. Alimarin and B. I. Frid. *Zavodskaya Lab.* 8, 498(1939); *Chem. Zentr.* 1939, II, 2780.—Fe is completely sepd. from rare earths by electrolysis in an acid soln. The rare earths remain in soln. Pt wire was used as anode. Electrolysis was at 2-3 amp., 7 to 8 volts, 1-2 hrs., bath temp. 60-70°. The acid soln. of the rare earths was then analysed with a polarograph with a dropping-Hg electrode. Neither reduction reactions nor amalgam formation was observed. — M. Hosch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Ca

Quantitative microchemical analysis of minerals, ores and rocks. V. Colorimetric determination of iron. I. P. Alimarin and B. I. Frid. *Zavodskaya Lab.* 10, 252-3 (1941); cf. *C. A.* **35**, 2015⁸. Moisten 10-20 mg. of mineral or ore powder with 6 ml. of water and 3-4 drops of 1*N* H_2SO_4 and add 1 ml. of concd. HF soln. Heat first on a steam bath and then on a sand bath. Fuse the residue with $K_2S_2O_7$, dissolve the cold melt in very dil. hot H_2SO_4, add 1 drop HNO_3, and heat for 1 min. For each 0.1 mg. Fe_2O_3 add 3 ml. of 25% sulfosalicylic acid and dropwise 25% NH_4OH until yellow and then 0.5 ml. in excess. Dil. the colored soln. to the mark (1 ml. of colored soln. should contain not over 0.05 mg. Fe_2O_3) and after 5 min. compare in a colorimeter with a standard soln. contg. about 0.02 mg. Fe_2O_3 per ml.). In the presence of Mn add 0.2 g. of $NH_4OH.HCl$ before adding the NH_4OH. With rich Mn ores increase the hydroxylamine to 1 g. If the sample contains over 20% Al_2O_3 or MgO use 5 ml. of sulfosalicylic acid.

B. Z. Kamush

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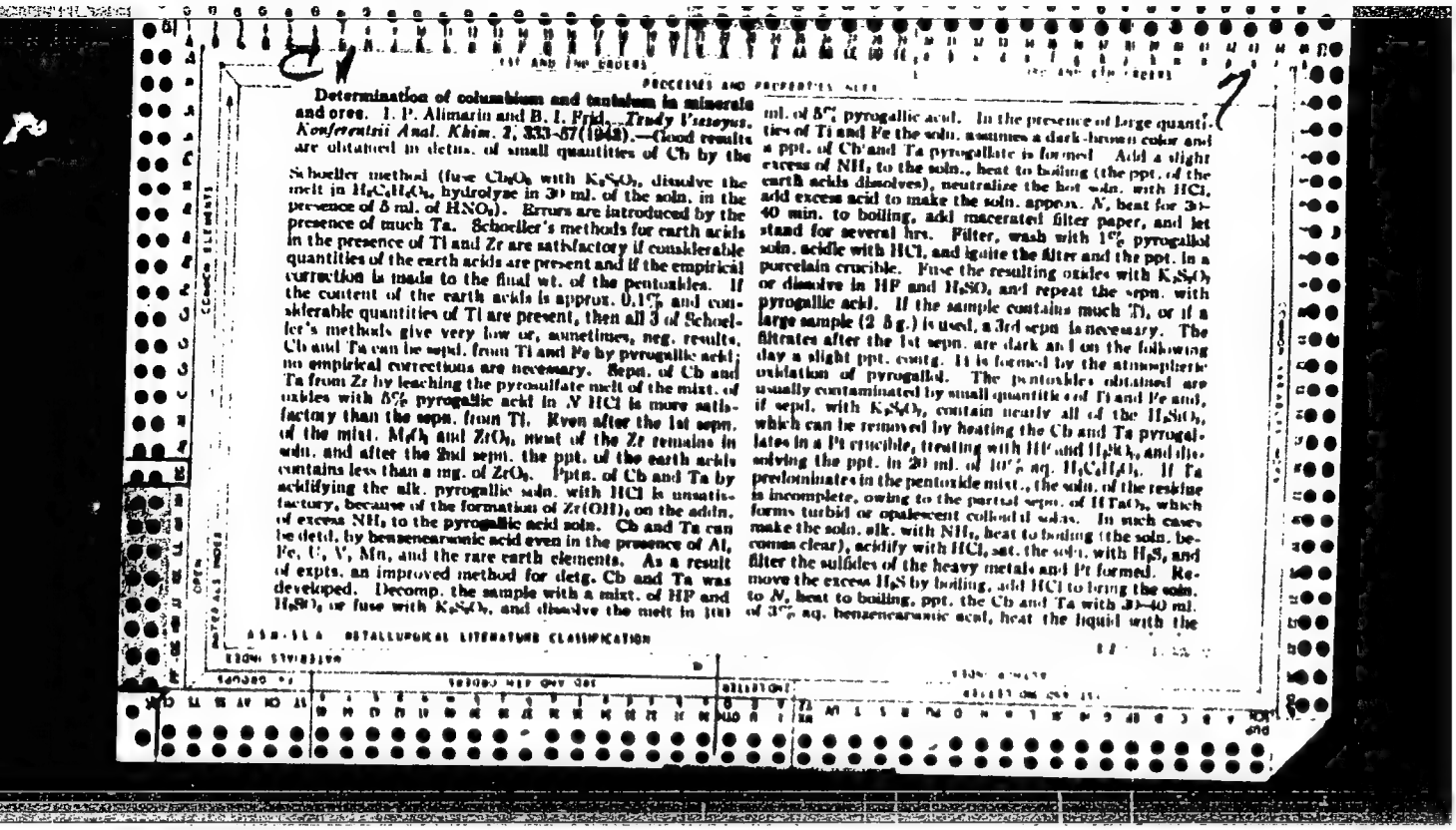
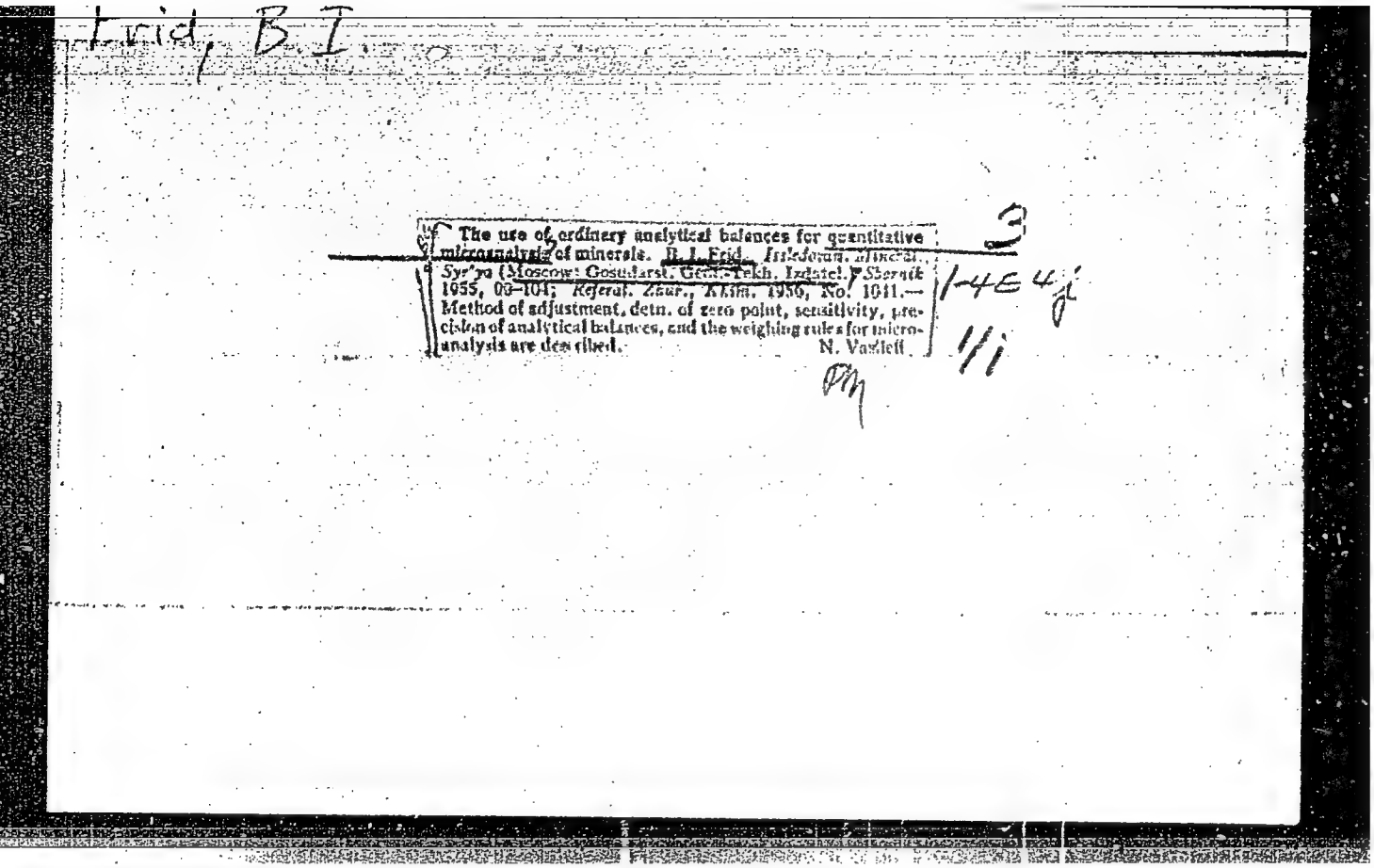


Determination of columbium and tantalum in minerals and ores. I. P. Alimarin and B. I. Frid. *Trudy Vsesoyus. Konferentsii Anal. Khim.* 2, 333-57(1943).—Good results are obtained in detns. of small quantities of Cb by the Schoeller method (fuse Cb_2O_5 with $K_2S_2O_7$, dissolve the melt in $H_2C_6H_6O_6$, hydrolyze in 30 ml. of the soln. in the presence of 5 ml. of HNO_3). Errors are introduced by the presence of much Ta. Schoeller's methods for earth acids in the presence of Ti and Zr are satisfactory if considerable quantities of the earth acids are present and if the empirical correction is made to the final wt. of the pentoxides. If the content of the earth acids is approx. 0.1% and considerable quantities of Ti are present, then all 3 of Schoeller's methods give very low or, sometimes, neg. results. Cb and Ta can be sepd. from Ti and Fe by pyrogallic acid; no empirical corrections are necessary. Sepn. of Cb and Ta from Zr by leaching the pyrosulfate melt of the mixt. of oxides with 5% pyrogallic acid in .N HCl is more satisfactory than the sepn. from Ti. Even after the 1st sepn. of the mixt. M_2O_5 and ZrO_2, most of the Zr remains in soln. and after the 2nd sepn. the ppt. of the earth acids contains less than a mg. of ZrO_2. Pptn. of Cb and Ta by acidifying the alk. pyrogallic soln. with HCl is unsatisfactory, because of the formation of $Zr(OH)_4$ on the addn. of excess NH_3 to the pyrogallic acid soln. Cb and Ta can be detd. by benzenearsonic acid even in the presence of Al, Fe, U, V, Mn, and the rare earth elements. As a result of expts. an improved method for detg. Cb and Ta was developed. Decomp. the sample with a mixt. of HF and H_2SO_4, or fuse with $K_2S_2O_7$, and dissolve the melt in 100 ml. of 5% pyrogallic acid. In the presence of large quantities of Ti and Fe the soln. assumes a dark-brown color and a ppt. of Cb and Ta pyrogallate is formed. Add a slight excess of NH_3 to the soln., heat to boiling (the ppt. of the earth acids dissolves), neutralize the hot soln. with HCl, add excess acid to make the soln. approx. N, heat for 30–40 min. to boiling, add macerated filter paper, and let stand for several hrs. Filter, wash with 1% pyrogallol soln. acidic with HCl, and ignite the filter and the ppt. in a porcelain crucible. Fuse the resulting oxides with $K_2S_2O_7$ or dissolve in HF and H_2SO_4 and repeat the sepn. with pyrogallic acid. If the sample contains much Ti, or if a large sample (2–5 g.) is used, a 3rd sepn. is necessary. The filtrates after the 1st sepn. are dark and on the following day a slight ppt. contg. Ti is formed by the atmospheric oxidation of pyrogallol. The pentoxides obtained are usually contaminated by small quantities of Ti and Fe and, if sepd. with $K_2S_2O_7$, contain nearly all of the H_2SiO_3, which can be removed by heating the Cb and Ta pyrogallates in a Pt crucible, treating with HF and H_2SO_4, and dissolving the ppt. in 20 ml. of 10% aq. $H_2C_6H_6O_6$. If Ta predominates in the pentoxide mixt., the soln. of the residue is incomplete, owing to the partial sepn. of $HTaO_3$, which forms turbid or opalescent colloidal solns. In such cases make the soln. alk. with NH_3, heat to boiling (the soln. becomes clear), acidify with HCl, sat. the soln. with H_2S, and filter the sulfides of the heavy metals and Pt formed. Remove the excess H_2S by boiling, add HCl to bring the soln. to N, heat to boiling, ppt. the Cb and Ta with 30–40 ml. of 3% aq. benzenearsonic acid, heat the liquid with the

ppt. on a sand bath until the ppt. coagulates completely, add macerated paper, and let stand overnight. Filter, wash with 4% NH_4NO_3 soln. acidic with HNO_3, and ignite in porcelain. Remove the adsorbed alkali metals by moistening the ignited pentaoxides with 1-2 ml. of 5% HNO_3, digest on a water bath for 5-10 min., make alk. with NH_4, filter through a dense filter, wash with 4% NH_4NO_3, and ignite the filter with the residue in the same crucible. To correct the results for the content of Ti, fuse the oxides with $K_2S_2O_7$, dissolve the melt in 5% H_2SO_4 contg. H_2O_2, transfer the colored soln. to a measuring flask, and det. Ti colorimetrically. Cb and Ta in cassiterites can be det. colorimetrically by the Platonov method (*C.A.* **31**, 4814[9]; **32**, 2209[9]), which is based on their property of forming col. colored complds. with pyrogallic acid in $H_2C_2O_4$ soln. (Ta gives a color in acid soln. only, and Cb in basic soln.). In the presence of large quantities of the earth acids, better results are obtained with a combination tannin and pyrogallic methods: a single sepn. with tannin in $H_2C_2O_4$ soln. according to Scheeller, and colorimetric detn. of Cb in the Ta ppt. and of Ta in the Cb ppt. Twenty-one references.

W. R. Hunt



Frid, B. I.

The use of ordinary analytical balances for quantitative microanalysis of minerals. B. I. Frid. *Issledovan. mineral. Syr'ya* (Moscow: Gosudarst. Geol.-Tekh. Izdatel.) *Sbornik* 1955, 99–104; *Referat. Zhur., Khim.* 1956, No. 1011.—Method of adjustment, detn. of zero point, sensitivity, precision of analytical balances, and the weighing rules for microanalysis are described.
N. Vasileff

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1/1

FRID, B. I.

USSR/Fitting Out of Laboratories - Instruments. H-
Their Theory, Construction, and Use.

Abs Jour : Ref Zhur - Khimiya, No 3, 1957, 8713

Author : Frid, B.I.
Inst : A Commission on Analytical Chemistry, Academy of Sciences USSR
Title : An Electrode for Potentiometric Microtitrations.

Orig Pub : Tr. Komis. po analit. khimii. AN SSSR, 1956, 7, No 10, 170-173.

Abstract : The design of a microelectrode for potentiometric microtitrations in which the indicator electrode (IE) and reference electrode (RE) are mounted together and connected electrolytically by means of a saturated solution of Na_2SO_4 or KCl occupying the space between two concentric glass tubes, the inner of which serves to insulate and hold the IE, is described. The two glass tubes form a ground glass joint at the lower end, thus, preventing

Card 1/2

ALIMARIN, Ivan Pavlovich; FRID, Berta Izrailevna; LEONT'YEVA, K.D., red.; KOGAN, V.V., tekhn. red.

[Quantitative microchemical analysis of minerals and ores; laboratory manual] Kolichestvennyi mikrokhimicheskii analiz mineralov i rud; prakticheskoe rukovodstvo. Moskva, Gos. nauchno-tekhn.izd-vo khim.lit-ry, 1961. 399 p. (MIRA 15:1)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut mineral'nogo syr'ya (for Alimarin, Frid)

(Mineralogical chemistry) (Microchemistry)

FRID, D. I., Candidate Med Sci (diss) -- "The surgical anatomy of the arterial blood supply of the pancreas (Anatomical-experimental investigation)"/ Leningrad, 1959. 17 pp (State Order of Lenin Inst for the Advanced Training of Physicians im S. M. Kirov), 250 copies (KL, No 22, 1959, 123)

FRID, D.I.

Arterial blood supply of the pancreas. Sbor. nauch. trud. GIDUV no. 14:205-215 '58. (MIRA 13:10)

1. Iz kafedry operativnoy khirurgii Gosudarstvennogo instituta dlya usovershenstvovaniya vrachey (zav. kafedroy prof. A.P. Nadein) i Pontonoy bol'nitsy Kolpinskogo rayona Leningrada (glavnyy vrach L.A. Krishtovich).
(PANCREAS—BLOOD SUPPLY)

FRID, D.I.

Capsule of the pancreas and its significance in acute pancreatitis. Sbor. nauch. trud. GIDUV no. 14:216-219 '58. (MIRA 13:10)

1. Iz kafedry operativnoy khirurgii Gosudarstvennogo instituta dlya usovershenstvovaniya vrachey (zav. kafedroy prof. A D. Nadein) i pontonnoy bol'nitsy Kolpinskogo rayona Leningrada.
(PANCREAS--DISEASES)

[illegible], L. [illegible], [illegible], Ya. S., [illegible], V. [illegible], [illegible], [illegible]

Apparatus for artificial circulation with [illegible] Installation 171

Novyye khirurgicheskie apparaty i instrumenty i opyt ikh primeneniya (New Surgical Equipment and Instruments and Experience in Their Use) Vol. 1, Moscow, 1957. A collection of Papers of the Scientific Research Inst. for Experimental Surgical Equipment and Instruments.

NIIEKhAI

FRID, E. I.

USSR

Thermal resistivity of $Li_2O.Al_2O_3.4SiO_2$ ceramic materials. I. D. Finkel'shtein and E. I. Frid. *Voprosy Petrogr. i Mineral., Akad. Nauk S.S.S.R.* 2, 381–6(1953).—The particular ease with which β-spodumene is formed below 500° in the presence of strong mineralizers (e.g. WO_3) or by hydrothermal methods is striking. To synthesize spodumene, a mix of Li_2CO_3 16.6; kaolin from Prosyanovsk 39.6; plastic Chasov-Yar clay 16.6; and quartz sand 27.2% was heated to 1230–1320° for 12 hrs. The cryst. phase, with n of about 1.516, was β-spodumene contaminated by some mullite, residual quartz, and glass. The thermal expansion coeff. was 1.23×10^{-6} between 20° and 1000°. The ceramic properties of β-spodumene were similar to feldspar, and its melt was highly viscous at 1210°, the thermal expansion being similar to that of synthetic cordierite (with 2.2×10^{-6}) if fired at 1420°. The thermal shock (spalling) resistivity was very high. W. Eitel

FRID, F.P.

24(8) PHASE I BOOK EXPLOITATION SOV/3459

Moscow. Vsesoyuznyy teplotekhnicheskiy institut

Teploobmen pri vysokikh teplovykh nagruzkakh i drugikh spetsial'nykh usloviyakh; sbornik statey (Heat Exchange Under High Thermal Loads and Other Special Conditions; Collection of Articles) Moscow, Gosenergoizdat, 1959. 135 p. 4,000 copies printed.

Ed. (Title page): A. A. Armand; Ed. (inside book): I. K. Kerikovskiy; Tech. Ed.: G. I. Matveyev.

PURPOSE: The book is intended for personnel of scientific research institutes, planning and design organizations, and for power engineers.

COVERAGE: This collection of 9 articles presents the results of research conducted at the All-Union Heat Engineering Institute. Problems of heat exchange under high pressure and other special conditions are analyzed. Attention is devoted to special cases such as heat exchange from wall to water, including cases of ordinary and surface boiling; heat transfer to steam and water under supercritical parameters; heat exchange from pipe wall to gas under high pressure; and the hydraulic resistance of a heated tube. References are given at the end of each article.

AVAILABLE: Library of Congress (QC320.M68)

Card 3/3

BV/lmc
5-4-60

SOV/96-59-9-15/22

AUTHORS: Doroshchuk, V.Ye. (Candidate of Technical Sciences) and Frid, F.P. (Engineer)

TITLE: The Influence of Throttling the Flow and of Heating a Length of Pipe on Critical Thermal Loadings

PERIODICAL: Teploenergetika, 1959, Nr 9, pp 74-79 (USSR)

ABSTRACT: A good deal of experimental work has been published on critical thermal loadings during forced flow of water and steam/water mixtures, but unfortunately there are considerable differences between the results of various authors. Recently workers in the Power Institute of the Ac. Sc. USSR have published articles in Teploenergetika and elsewhere in which they point out the important effects of throttling the flow at the inlet to the experimental channel and of the heated length of the experimental pipe. It is claimed that throttling disturbs the flow, alters the structure of two-phase flow and causes boiling of the water. Alteration in the length of pipe heated also alters the structure of flow in heated and unheated pipes. Therefore, the degree of stabilisation of flow structure at constant velocity, pressure and steam content at the point where critical

The Influence of Throttling the Flow and of Heating a Length of Pipe on Critical Thermal Loadings

conditions occur, depends on the distance of this point from the commencement of heating. These views cannot be ignored because they introduce important factors not usually considered. The experimental rig used in the Power Institute of the Ac. Sc. USSR is illustrated diagrammatically in Fig 1 and is briefly described. From consideration of this system it is concluded that one of the heat exchangers is a source of considerable pulsation which might affect the experimental section of the apparatus and the critical thermal loadings. It is accordingly possible that the observed influence of throttling the flow and of the length of heated pipe may be peculiar to the equipment used in the Power Institute. The All-Union Thermo-Technical Institute accordingly investigated the influence of flow pulsation, and of the length of pipe heated, on critical thermal loading. A diagram of their experimental rig is given in Fig 2 and it is briefly described. The experimental procedure and methods of measurement are also recounted. In order to determine the influence of throttling on critical thermal loadings, tests were made with the throttling valve in

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different positions, with different rates of flow, and with water heated to different temperatures. The results of the tests are plotted in Fig 3 and they show that turbulence caused by throttling at the inlet has no influence on the critical thermal load. Moreover, the results confirm that any effect of throttling is not due to the flow becoming turbulent. The effect only alters the large pulsations of working fluid leaving the heat exchanger in the Power Institute's equipment. The way in which the pulsations could occur in the heat exchanger is explained. Two series of tests were run to check the explanation; the results, plotted in Fig 4, confirm that pulsations really do reach the measuring section. Unfortunately, low-inertia instruments were not available and the magnitude of the pulsation could only be judged by movements of the manometer needles. The question of the influence of the length of the tube heated is of considerable inportance as most laboratory rigs use relatively short tubes whilst long tubes are found in practice. Tests were accordingly made with water and

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steam/water mixture on tubes of various lengths at a pressure of 100 atms. To ensure that the installation was similar in other respects the only change made was to make one of the electric contacts moveable. In order to check the rate of flow a cooler, which is not shown in Fig 2, was installed at the outlet from the experimental section in order to condense the steam/water mixture to a single-phase liquid. Two series of tests were run at a pressure of 100 atm; the test conditions are given and the test results are plotted in Figs 5 and 6. They show that the length of tube heated has practically no influence on the critical thermal loading for the ratios of length to diameter investigated. The lack of experimental points on the right-hand side of the graph in Fig 5 results from the fact that critical conditions do not arise at high rates of flow and steam contents around 0,5. Returning again to the experimental results of the Power Institute concerning the influence of the length of tube heated, it is assumed that they reached their conclusion because they disregarded the important pulsations of working substance that occur in their apparatus.

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To confirm this the present experiments on tubes of different lengths were repeated with pulsation present. The results are plotted in Fig 7 and Fig 8, where the straight lines correspond to the mean results obtained for tubes of various lengths in tests without pulsation (Figs 5 and 6). The peculiar shape of the curves obtained in the presence of pulsation is explained as being due to differences in the steam content in the water in different parts of the pipe at different times. It is only when conditions are such that steam/water mixture is present throughout the pipe that the curves come into line with those obtained in the absence of pulsation. This confirms that the results attributed by the Power Institute of the Ac. Sc. USSR to other factors are really due to pulsation. The important part played by pulsation flow in governing critical heat transfer has no direct relationship to the selection of permissible heat loadings in vessels containing water under pressure because, in the absence of a steam phase in the first circuit, there is no reason for pulsations to arise. Disturbances of

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flow due to local resistances have much less influence on critical thermal loadings than pulsations caused by steam condensation.

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(RECTUM--TUMORS) (INTESTINES--TUMORS)
(HYPOTENSION)

FRID, I. L.

USSR/Engineering - Tools

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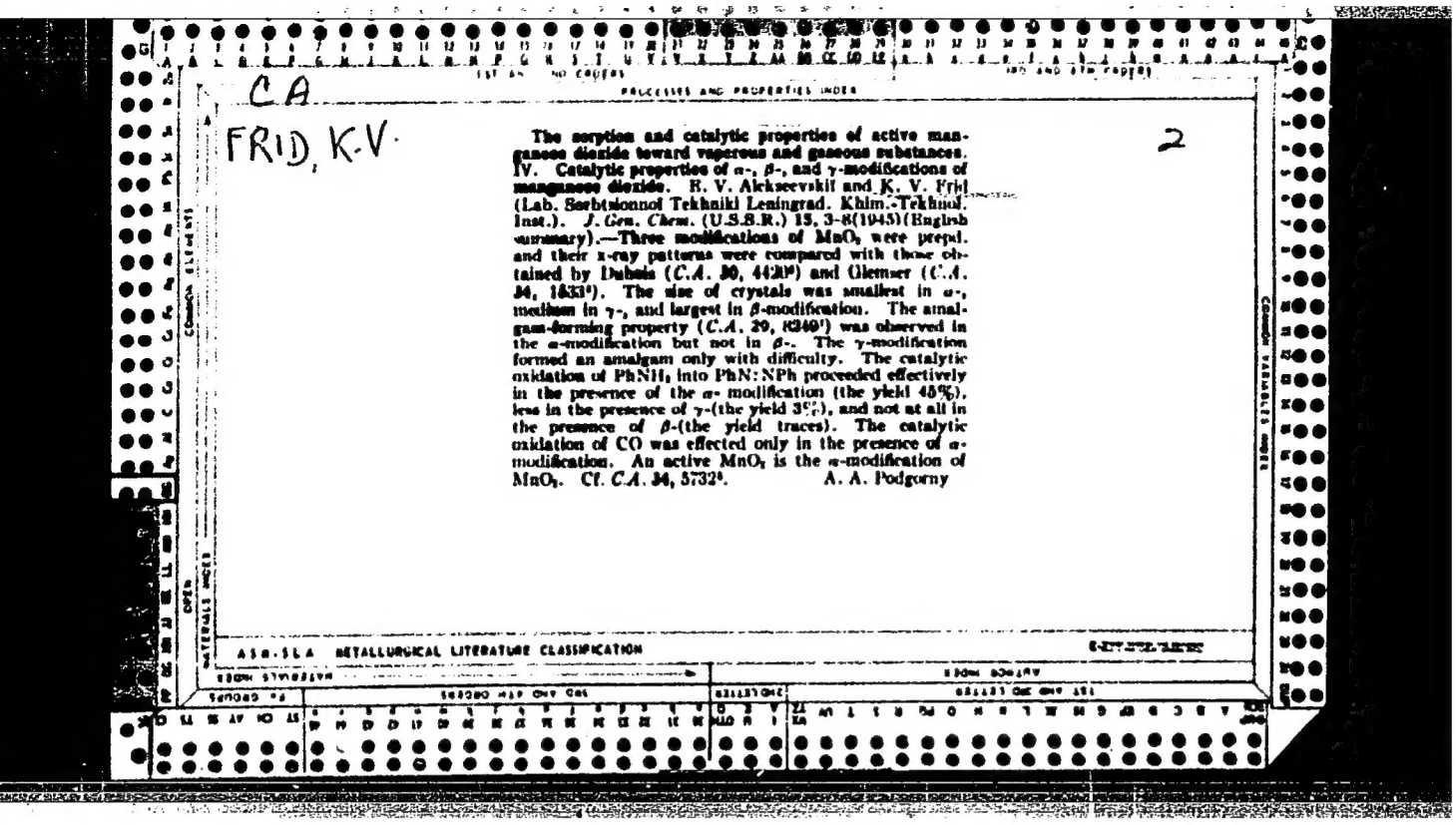

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FRID, K.V.

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